UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,858	12/21/2001	Matthew Philip Aubury	EMB1P075 (44359/08330)	1827

7590 09/23/2004

C. Douglas McDonald
Carlton Fields, P.A.
P. O. Box 3239
Tampa, FL 33601-3239

EXAMINER	
PHAM, CHRYSTINE	
ART UNIT	**PAPER NUMBER**
2122	

DATE MAILED: 09/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/026,858	AUBURY, MATTHEW PHILIP	
	Examiner	Art Unit	
	Chrystine Pham	2122	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 December 2001* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed on 21 December 2001 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 5-8, 10-13, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodnow, II et al. (US 5590329) (hereinafter *Goodnow, II et al.*), further in view of Beard (US 5875335) (hereinafter *Beard*).

- As per claim 1, *Goodnow, II et al.* teach a method (e.g., see FIG.3-12b & associated text), a system (e.g., see Abstract, see FIG.1 & associated text), and a computer program product (e.g., see *software testing and debugging tool* col.2:37-40, col.5:27-32) for program data transfer reporting (e.g., see *200* FIG.2a & associated text, see *Pointer Save Stack 65* FIG.1 & associated text, col.13:61-67); comprising the steps of:

- compiling a source program (e.g., see FIG.2b & associated text, col.3:22-23, col.6:20-22);
- executing the program (e.g., col.3:22-23, col.3:29-31, col.6:20-22, see FIG.2b & associated text, col.8:13-19, see *1260* FIG.12a & associated text), wherein the program passes data

implicitly using pointers (e.g., see *545* FIG. 5b & associated text, col.13:45-52, see *Pointer Save Stack 65* FIG.1 & associated text, col.13:61-67);

- tracing accesses to memory (load/store instructions) (e.g., see *reading, writing* col.1:43-46) for generating a trace (e.g., see *pointers* col.1:24-25, col.2:63-col.3:12, see FIG.2a & associated text, col.6:65-col.7:5, col.7:33-39, col.7:55-64, col.9:40-45, see *505* FIG. 5a, 5b & associated text, col.11:38-52, see *337* FIG.3 & associated text);
- analyzing the trace (e.g., col.11:56-60, see *510* FIG.5a & associated text); and
- generating memory use profile data based on the trace (e.g., see *435* FIG.4 & associated text, col.11:7-11).

Goodnow, II et al. further teach the trace including a map of all memory accessed during execution of a single function (e.g., see FIG.2a & associated text, col.2:45-58, col.3:21-42, see *337* FIG.3 & associated text) and the use profile data including memory use behavior of portions of the program (e.g., see *pointer assignment, pointer dereference, dereferenced pointer* col.3:1-12, col.3:49-55, col.7:65-67, see *status entry 260* FIG.2a & associated text, col.8:35-41, see *435* FIG.4 & associated text, col.11:7-11, see *370* FIG.3 & associated text, see FIG.7 & associated text, see *1016, 1018* FIG.10a & associated text, see *1040, 1050* FIG.10b & associated text, see FIG.13 & associated text).

Goodnow, II et al. do not expressly disclose compiling the source program to a platform-independent bytecode. However, *Beard* discloses a method (e.g., see Abstract) and system (e.g., see FIG.1, 2, 3 & associated text) for compiling a source program to a platform-independent bytecode (e.g., col.1:64-col.2:4, see *compiler 20* FIG.2 & associated text, col.4:22-32), executing the program (e.g., col.4:35-37, see *interpreter 22* FIG.2 & associated text), wherein he program passes data implicitly using pointers (e.g., col.7:51-56, col.8:40-42, see FIG.6-7B & associated text). *Goodnow, II et al.* and *Beard* are analogous art since they are both directed at compiling and executing of software programs. It would have been obvious to one of ordinary skill in the

pertinent art at the time the invention was made to modify the teaching of *Goodnow, II et al.* using that of *Beard.* to generate platform-independent bytecode from compiling the source program. And the motivation for the modification would have been that compiling a source program to a platform-independent bytecode eliminates the need to write multiple versions of the same program for execution on each of the different operating platforms. In other words, it enables the distribution, installation, and execution of the original program among users of a variety of different types of computers, all having different operating platforms.

As per claims 2-3 and 5, they recite limitations which have been addressed in claim 1, therefore, are rejected for the same reasons as cited in claim 1.

Claim 6 recites a computer program product version of the method addressed in claim 1, therefore, is rejected for the same reasons as cited in claim 1.

As per claims 7-8, and 10, they recite limitations which have been addressed in claims 6 & 1, therefore, are rejected for the same reasons as cited in claims 6 & 1.

Claim 11 recites a system version of the method addressed in claim 1, therefore, is rejected for the same reasons as cited in claim 1.

As per claims 12-13, and 15, they recite limitations, which have been addressed in claim 1, therefore, are rejected for the same reasons as cited in claim 1.

4. Claims 4, 9, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Goodnow, II et al.* in view of *Beard* as applied to claim 1 above, further in view of Lim et al. (US 6785886), hereinafter, *Lim et al.*.

As per claim 4, the combined teachings of *Goodnow, II et al.* and *Beard* (hereinafter ***G2***) teach a method, system, and computer program product as recited in claim 1. ***G2*** do not expressly disclose the step of analyzing the trace including determining where memory transfers take place between domains of a partitioned system. However, *Lim et al.* disclose a system (e.g., see FIG.1, 2, 7 & associated text) and method (e.g., col.1:18-24) for reporting program data transfer (e.g., col.12:50-55) comprising the steps of executing a program (e.g.,col.21:52-56, col.22:36-39), tracing/mapping all memory accesses (load/write operations) (e.g., col.4:53-56, col.5:63-65, col.4:45-60, col.6:6-16, col.11:19-22, col.26:12-22) of a function (e.g., col.15:8-11) and determining where memory transfers (e.g., see *decision 204* FIG.7 & associated text, col.7:53-57, col.8:54-58, col.9:48-51) take place between domains (e.g., see *direct execution 202, binary translation 200* Fig.7 & associated text) of a partitioned system (e.g., see *one or virtual machines, segmented architecture* col.1:18-24, see *memory segments* col.5:17-21, col.5:55-56, col.26:12-22). ***G2*** and *Lim et al.* are analogous art since they are both directed at tracing memory accesses of a software program. It would have been obvious to one of ordinary skill in the pertinent art at the time the invention was made modify the teaching of ***G2*** using that of *Lim et al.* to enable determining where memory transfers take place between domains of a partitioned system. And the motivation for doing so would have been that partitioning a system allows different hardware/machine architectures/ processor (e.g., Intel x86) and their instructions to be virtualized, thus, applications written for different operating systems/architectures to run concurrently on the partitioned system without the need for reboot between applications. However, there exist operating systems or architectures having instruction sequences or segments that are non-virtualizable which render their "direct execution" (i.e., an execution with reduced privileges, which generates traps that are to be emulated by the partitioned system to allow correct and faster execution of the operating system on the partitioned system) unsafe since the segments may have descriptors which have been modified and rendered non-reversible (non-reversibility makes virtualization of hardware architecture incomplete or impossible) making the effect of an instruction sequence unsafe, that is to say, the effect is not guaranteed to be

contained in the virtual machine. It would have been obvious to one of ordinary skill in the pertinent art at the time the invention was made that direct execution technique maximizes performance, whereas binary translation which ensures the emulation of the entire virtual architecture (which mismatches with an underlying architecture) to allow the concurrent execution of al virtual machines (operating systems and applications), however, at a significantly minimized performance level. Thus, it would have been obvious to one of ordinary skill in the pertinent art at the time the invention was made that the ability to determine where and when memory transfers take place between said domains of a partitioned system enables operating systems/architectures and their instructions/applications with different requirements to be executed in the best, most suitable mode.

As per claim 9 and 14, they recite limitations, which have been addressed in claim 4, therefore, are rejected for the same reasons as cited in claim 4.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:
   - Apparatus region-based detection of interference among reordered memory operations in a processor, Moreno et al. (US 5918005)
   - Virtual machine with securely distributed bytecode verification, Levy et al. (US 6092147)
   - System for modifying relocatable object files to monitor accesses to dynamically allocated memory, Hastings (US 5193180)
   - Recovery from data fetch errors in hypervisor code, Arndt (US 6658591)

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chrystine Pham whose telephone number is 703.605.1219. The examiner can normally be reached on Mon-Fri, 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q Dam can be reached on 703.305.4552. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chrystine Pham
Examiner
GAU 2122

*** After October 25, 2004, examiner can be reached at new telephone number (571) 272-3702, and the examiner's supervisor, Tuan Q. Dam can be reached on (571) 272-3694.

TUAN DAM
SUPERVISORY PATENT EXAMINER